

pleted, especially as our knowledge of the changes is too limited to permit of the use of Ross's observations. Further it is desirable to have actual verification of Gauss's extension by theory of the magnetic elements at places where they are known to places where they are unknown. The position of the south magnetic pole is still undetermined, and magnetic observations are wanted from 40° S. to the geographical pole. For the carrying out of these views, Melbourne Observatory, being furnished with the necessary instruments, would serve admirably as a base station, with subsidiary bases at the Cape, and at Sandy Point, Magellan Strait, for the use of portable absolute instruments. Much of the survey could be done on board ship at sea, observations having now become so trustworthy by the process of "swinging ship." Portable instruments could also be used on ice, where their readings would be specially free from sources of error. The great effect of the ship's iron in high latitudes can be got rid of by experience, as proved in the voyage of the *Challenger*, an important matter being a proper position on board for the instruments. This position could be chosen immediately after the selection of the ship. The error in the vertical component varies with the "heel" of the ship; the horizontal error can be eliminated by the process of "swinging."

NOTES FROM THE OTAGO UNIVERSITY MUSEUM

VIII.—On the Claspers of *Callorhynchus*

IN my friend Mr. Patrick Geddes' able article, "Reproduction," published in the recently issued twentieth volume of the "Encyclopædia Britannica" (ninth edition), the following note occurs (p. 410):—

"In the curious Holocephalous fish, *Callorhynchus*, Jeffery Parker has recently adduced arguments for regarding the claspers as the surviving rudiments of a third pair of limbs."

As this passage was written under the mistaken impression that a somewhat wild theory, hitherto only communicated privately to one or two friends, had been published, I think it will be advisable to state exactly the grounds on which I am disposed, provisionally, to consider the Holocephali as the only existing hexapodous vertebrates.

In the Elasmobranchii (Plagiostomi) the male is well known to possess a single pair of so-called claspers, each having the form of a plate rolled longitudinally upon itself so as to produce an incomplete tube, and supported by a more or less complicated cartilaginous skeleton continuous with the basipterygial cartilages of the pelvic fin.

In *Callorhynchus*, on the other hand—and I believe the same applies to *Chimera*, of which I have no specimen—the male has two pairs of organs, which may be called respectively the anterior and the posterior claspers. The posterior claspers are evidently homologous with the claspers of the Elasmobranchs: they occur in the same position, have the form of a plate rolled longitudinally into a tube, and are supported by a prolongation of the basipterygium. No doubt, like the corresponding organs in sharks and rays, they have an intermittent function.

The structures I call anterior claspers are situated a short distance cephalad of the vent, inclosed, in the position of repose, in a pouch of skin having a somewhat contracted slit-like aperture, so that the clasper is ordinarily hidden from view. The aperture of the sac is erroneously marked "peritoneal aperture" in Günther's figure of *Chimera collei* ("Study of Fishes," p. 184). In connection with the sac is a gland secreting a lubricating fluid, and closely resembling the well-known gland of the Elasmobranch clasper.

In the female, although the clasper itself is absent, a small glandular sac occurs in the corresponding position.

The anterior clasper itself is a somewhat complicated organ, consisting of three chief parts supported by cartilage. The largest of these, which forms the main support of the whole structure, is a strong irregular cartilaginous plate, articulated by an elongated surface with the anterior border of the pubic portion of the pelvic girdle in such a way that when in its ordinary position of retraction, the whole apparatus is folded back in the hollow furnished by the outer surface of the pubic cartilage. To this principal cartilage of the anterior clasper are attached two others: one a thin delicate plate, shaped like the human external ear, the use of which is not obvious; the other a somewhat thicker plate, rolled upon itself to form a tube, in much the same way as the posterior clasper, and evidently serving as a duct for the passage of the above-mentioned secretion. The whole apparatus is covered with soft mucous membrane,

except the free portion of the principal cartilage which is studded with minute sharp denticles.

The clasper is exerted by the action of a strong muscle arising from the inner face of the pubic cartilage and passing over its anterior border to be inserted into the principal cartilage of the clasper. The plane of movement of the organ is nearly horizontal.

That a serial homology (homoplasia) exists between the anterior and the posterior claspers is suggested by the following facts:—(a) The general similarity of their structure; (b) they both articulate, mediately or immediately, with the pelvic cartilage; (c) they both lie in the line of Balfour's lateral ridge, i.e. of the hypothetical lateral fin; (d) the blood from both appears to be poured into a vein which is clearly the representative of the lateral vein of Elasmobranchii, which latter I have adduced reasons for considering as the vein of the proto-vertebrate lateral fin (*Trans. N.Z. Inst.*, vol. xiii. p. 413, and vol. xv. p. 222; *Proc. Roy. Soc.*, June 1886).

I regret that all my efforts to obtain earlier embryos of *Callorhynchus* than those I described three years ago in *NATURE* (vol. xxix. p. 46) have failed. It must therefore remain for future investigations to decide whether the anterior clasper of Holocephali is developed from a portion of the lateral ridge which usually atrophies, and whether its skeleton is formed by the concrescence of pterygiophores (radial fin-cartilages).

At present, therefore, the hypothesis that the anterior claspers of the Holocephali represent a middle pair of limbs is nothing more than a deduction from an unproved theory. I should not have ventured to publish it without further evidence if my friend had not, quite inadvertently, forced my hand.

Dunedin, N.Z., August 16

T. JEFFERY PARKER

SOCIETIES AND ACADEMIES

SYDNEY

Linnean Society of New South Wales, July 28.—Prof. W. J. Stephens, M.A., F.G.S., President, in the chair.—The following papers were read:—On some new or rare fishes from the Australian region, by E. P. Ramsay, F.R.S.E., and J. Douglas-Ogilby. A few notes are given on the curious Blennoid genus *Xiphasia* of Swainson, and a description is given of a species—*Xiphasia setifer*, Swainson—now for the first time taken in Australian waters. *Arrhamphus sclerolepis* and *Gastrolokeus biaculeatus* are recorded as fishes not previously seen on the New South Wales coast.—Catalogue of the Australian Coleoptera, part 5, by George Masters. The present part contains the large family of the Curculionidae, numbering over 1200 species, and bringing the total number now catalogued up to 5625. It was stated that probably two more parts would complete the order Coleoptera.—Miscellanea Entomologica, No. 2: the genus *Liparetrus*, by William Macleay, F.L.S. This is a complete monograph of the genus *Liparetrus*. All the old species are redescribed, many new ones added, and the genus is subdivided into several sections and sub-sections. Altogether about 100 species are characterised.—Revision of the Australian Lepidoptera, No. 1, by E. Meyrick, B.A., F.E.S. Five families of the Macro-Lepidoptera, or Lesiadae, Arctiadae, Hypsiadae, Syntomididae, and Zygaenidae, are monographed, numbering about 150 species, about half that number being new to science.—Notes on synonymy of Australian Micro-Lepidoptera, by E. Meyrick, B.A., F.E.S. The synonymy of fifteen species of Micro-Lepidoptera is corrected, from an examination of specimens in the British Museum.

PARIS

Academy of Sciences, October 18.—M. Jurien de la Gravière, President, in the chair.—A theory of the unequal flow of gases, by M. Haton de la Goupillière. Although geometers have already solved a few questions relating to the unequal movement of fluids, no general theory appears to have yet been applied to the subject so far as regards the gases. The object of the present paper is to make good this want, and to present a complete solution of the problem in connection with the receptacles of compressed air for locomotives or tramways filled from reservoirs maintained by the compressing engines at a constant tension.—Researches on the tension of the dry bicarbonate of ammonia, by MM. Berthelot and André. The authors here discuss the important and complex problem, whether the tension of ammonia in the air, the ground, and natural waters, and its movements between these various mediums, is to be assimilated

to the tension of this free alkali dissolved in pure water and to its diffusion between an inert atmosphere and purely aqueous solutions. Numerous experiments here described show that the function of the three constituents of sal ammoniac is not the same in its dissociation, the carbonic and ammoniac gases, even in great excess, possessing no perceptible influence on the tension of the bicarbonate at the ordinary temperature, while liquid water determines its decomposition independently of the laws of dissociation of the salt.—On the origin of the motor nerves in the palate of the dog, by M. Vulpian. His experiments on the origin of the secreting nerves of the salivary glands and of the chord of the tympanum have led the author to the study of this subject, his conclusions mainly confirming the results already obtained by M. Chauveau, who operated on the horse and the ass.—Experimental researches on the cause of *rigor mortis*, by M. Brown-Séquard. In continuation of his previous paper (see last week's NATURE, p. 612), the author describes certain experiments, which seem to show that this phenomenon mainly depends on a contraction, that is, a muscular vital act beginning or continuing after the general extinction of life. At the same time it is not denied that a coagulation of the albuminous substances may also to some extent contribute to the rigidity which sets in immediately after death.—The mountain plants of the Parisian flora, by M. Chatin. It is shown that associated with the ordinary vegetation of the Paris district are found numerous highland and even Alpine specimens, such as *Swertia perennis*, *Atropa Belladonna*, *Euphrasia lutea*, *Digitalis lutea*, *Veronica montana*, &c., most of which are largely represented in the Alps and Scandinavia, and some few in the south of France. They generally flourish in localities where the conditions of life approach nearest to those presented by the Alps; but whether they are due to migration from those regions or are indigenous is a question reserved for future discussion.—Analysis of some cosmic dust which fell on the Cordilleras near San Fernando, Chili, by M. A. E. Nordenskjöld. This specimen, received last February from M. Stolp, of San Fernando, and weighing about 2 grammes, yielded on analysis: oxide of iron 74.59, oxide of nickel 6.01, silicic acid 7.57, magnesia 3.88, alumina 2.90, and minute quantities of lime, phosphoric and sulphuric acid, with traces of oxide of copper. This analysis shows that it is not a product of the Krakatau eruption, but comes for the most part from the inter-planetary spaces.—On surfaces inclosing cones of the second degree, by M. E. Blutel. The case is considered in which each cone touches its inclosure following a moving circle.—On the determination of the coefficients of expansion by means of the pendulum, by M. Ch. Ed. Guillaume. It is shown that this method, recently proposed by M. Robert Weber, cannot possibly yield the accurate determinations anticipated by him. All the apparatus needed for its application render the process extremely complicated, while under the most favourable conditions its precision will never exceed 1/300.—Theoretical value of the local attraction at Nice, by M. Hatt. Theoretic researches undertaken for the purpose of determining this value have led to the results here communicated, including some data tending to correct the geodetic latitude of Nice.—On some pyridic bases, by M. A. Ladenburg. Having two years ago determined the methods of synthesis for the pyridic and piperidic bases, the author has since succeeded, with the aid of MM. Roth, Lange, and Hessekiel, in preparing a whole series of these bases, which are here described.—Researches on the evolution of the embryo of the fowl, when the eggs are submitted to incubation in the vertical position, by M. M. Dareste. Of sixteen eggs treated in this way, only one was successfully hatched, all the other embryos perishing at various dates and under diverse conditions.—On the relations of the Leptocephalidae to the conger-eel, by M. Yves Delage. Observations recently made at the Laboratory of Roscoff show that the Leptocephals, contrary to the opinion of Günther, are normal larvæ capable of transformation.—Contribution to the study of the Tertiary flora of the west of France and of Dalmatia, by M. Louis Crié. It results from this comparative study that five identical species and seven or eight closely-related types connect in a common palæophytic epoch the Tertiary districts of Mans and Angers in France with that of Monte Promina in Dalmatia.—On the discovery of a grave dating from the polished Stone Age, recently discovered near Crécy-sur-Morin, by M. A. Thieullen. The excavations carried out at this spot revealed two contiguous chambers built under a rock, and containing the skeletons of about thirty human beings of all ages and sexes, besides stone hatchets, knives, scrapers, and other relics of the Neolithic

period, but no traces of pottery or the metals. The human remains are remarkably well preserved, five or six of the skulls being almost intact, and by their form apparently indicating the presence of two distinct prehistoric races.—On a meteorite found in a block of Tertiary lignite from Wolfsegg, by M. Gurlt, with remarks by M. Daubrée. This rare specimen of a meteorite, traced to Tertiary times, forms a mass of cosmic iron combined with some carbon and nickel, weighing altogether 785 grammes.—On the constant presence of micro organisms in the thermal waters of Luchon (64° C.), and on their action on the production of baregine, by MM. A. Certes and Garrigou. The object of this paper is to determine the presence of living organisms in thermal waters of the highest temperatures, to ascertain their nature and the part played by them in the production of the baregine or glairine commonly found in sulphurous waters.—On melanosis, a disease of the vine, by MM. Pierre Viala and L. Ravaz. This is described as a malady of American origin, not very injurious to French vineyards, and due probably to a parasitic fungus identical with the *Septoria ampelina* described by Berkeley and Curtis.

BOOKS AND PAMPHLETS RECEIVED

"The Functions of the Brain," new edition, by Dr. D. Ferrier (Smith, Elder, and Co.).—"Journal of Royal Microscopical Society," October (Williams and Norgate).—"Experimental Chemistry," new edition, by C. W. Heaton (Bell and Sons).—"Origin of Languages," by H. Hale (Cambridge, Mass.).—"Concerning Force, Impulsion, and Energy," by J. O'Toole (Hodges, Dublin).—"On the Temperature and the Rainfall of the Croydon District, 1881-85," by H. S. Eaton.—"The Mechanism of Nature," by A. M. Stapley (Cornish, Manchester).—"Bibliotheca Historico-Naturalis et Mathematica: Lager Catalog" (Friedländer, Berlin).—"Notes from the Leyden Museum," vol. viii, No. 4, October, by Dr. F. A. Jentink (Brill, Leyden).—"Natural History," by Dr. H. A. Nicholson (Chambers).—"Diseases of Tropical Climates," by Dr. W. C. Maclean (Macmillan).—"Proceedings of the Royal Society of Edinburgh," Session 1885-86, No. 121.—"Carte Géologique Générale de la Russie d'Europe," Feuille 139.—"Bulletins du Comité Géologique St. Pétersbourg," Nos. 7 and 8, 1886.

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